REMARKS/ARGUMENTS

Responsive to the Official Action mailed November 26, 2004, applicants have further revised the claims of their application in an earnest effort to place this case in condition for allowance. Specifically, claim 18 has been canceled, and independent claim 12 amended. Reconsideration is respectfully requested.

Applicants wish to thank the Examiner for her careful consideration of applicants' previous response, and explanation of her position. However, as will be evident from the following discussion, rejection of the pending claims is based upon a reference which contemplates formation of a "highly deformable" thermoformed fibrous construct, in clear and significant distinction from the *relatively stiff* thermoformed fibrous construct that can be formed in accordance with the present invention. As noted previously, these desirable physical characteristics are achieved in the present invention through the use of an *incubation period, followed by cooling*, with a subsequent *thermal compression step effected, followed by cooling*, with ultimate thermoforming of the final desired molded construct thereafter. Applicants must respectfully maintain that the prior art simply does not teach or suggest formation of a molded construct in accordance with the present invention, as is evident from use of a *testing protocol for flexible materials* in the principal reference upon which the rejection is based. Accordingly, reconsideration is respectfully requested.

In the Action, the Examiner has rejected the pending claims under 35 U.S.C. §102, with reliance upon U.S. Patent No. 4,840,830, to Weinle et al., with reference to U.S. Patent Publication No. 2002/0160682, to Zeng et al. In the Action, the Examiner has stated that "the burden has shifted to the applicant to show unobvious differences between the claimed product and the prior art product". Applicants believe that this will be readily apparent from the *engineering testing protocol* contemplated in the principal Weinle et al. patent, in comparison to the testing protocol specified in applicants' specification and claims.

Study of the principal Weinle et al. patent shows the contemplated thrust of its teachings. At column 3, lines 19 *et seq.*, this reference states:

> A very significant feature of the headliner of the present invention which clearly distinguishes it from the conventional headliner constructions of the prior art is the *highly flexible* and resilient nature of the headliner. Unlike the prior art rigid foam or fiber glass headliners, the headliner of the present invention is *so highly deformable* and resilient *that it can be bent or flexed nearly double* to facilitate installation in the automobile (emphasis applied).

As previously discussed, applicants must respectfully maintain that Weinle et al. does not contemplate formation of a molded construct exhibiting the properties of the present invention since it does not teach or suggest formation of a molded construct in accordance with applicants' novel process. Perhaps this is not surprising since Weinle et al. contemplates formation of a "highly flexible" product.

At column 5, line 65 *et seq.*, noted by the Examiner, Weinle et al. describes the contemplated process as follows:

> These materials are placed in a heated oven and heated at a temperature and for a time sufficient to activate the potentially adhesive characteristics of the thermoplastic binder fibers. The heated fibrous batt is then molded as indicated at 52, into the desired contoured configuration. After the batt has been cooled sufficiently, it is removed from the mold and thereafter cut and trimmed into the finished size.

Clearly, this reference does not teach or suggest the formation of a molded construct, as claimed, from a fibrous batt having first been subjected to an incubation period, and thereafter cooled, with subsequent compression of the batt, at an elevated temperature, to a thickness greater than or equal to the final molded construct, *and thereafter cooled, with subsequent thermoforming.*

Applicants have revised their claims to specify the exhibited stiffness performance of products formed in accordance with their invention, wherein, in accordance with the tested samples, samples formed in accordance with the present invention exhibited at least 15% greater stiffness performance, per ASTM D-790, than a molded construct devoid of an incubated and cooled fibrous preform.

The "highly flexible" nature of the product formed in accordance with the Weinle et al. patent is plainly evident from the specified test method, the "cantilever beam stiffness test", per ASTM D-747. For the Examiner's convenient reference,

applicants include herewith brief summaries of their test method, ASTM D-790, and the test method referenced in the Weinle et al. patent, ASTM D-747. As specifically noted in connection with the ASTM D-747 test protocol specified in the principal Weinle et al. patent:

> The test method (D-747) is well suited for determining relative flexibility of materials over a wide range. *It is particularly useful for materials too flexible to be tested by Test Methods D 790.*

Thus, it is believed that it will be readily evident to those skilled in the art that constructs formed in accordance with the Weinle et al. patent will be "highly flexible", and be "highly deformable" to such an extent that applicants' specified test method *is not considered suitable for testing the Weinle et al. materials.*

Accordingly, those skilled in the art would find no reason to follow the teachings of Weinle et al. in forming constructs exhibiting stiffness characteristics in accordance with the present invention. This is further evident from Figure 3 of Weinle et al., wherein a molded construct of this patent is illustrated essentially "folded in half" to facilitate insertion through an automobile window.

It is respectfully maintained that the secondary Zeng et al. patent fails to overcome the clear deficiencies in the teachings of the Weinle et al. patent in teaching or suggesting the present invention as claimed.

For the Examiner's consideration, applicants are arranging to have a sample of the present molded construct delivered to the Examiner, and her consideration of such would be appreciated. This sample includes a consolidated fibrous batt, a similar consolidated fibrous batt which has been stabilized, a sample of this material having been subjected to at least partial compression at an elevated temperature, and finally, a portion of a completed molded construct.

In view of the foregoing, formal allowance of claims 12, 15, and 19-22 is believed to be in order and is respectfully solicited. Should the Examiner wish to speak with applicants' attorneys, they may be reached at the number indicated below.

The Commissioner is hereby authorized to charge any additional fees which may be required in connection with this submission to Deposit Account No. 23-0785.

Respectfully submitted,

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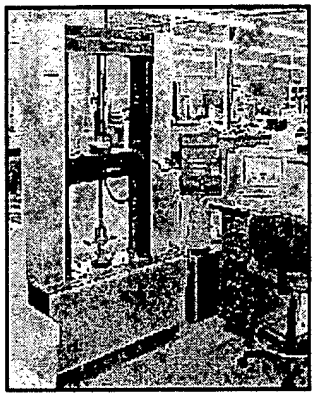
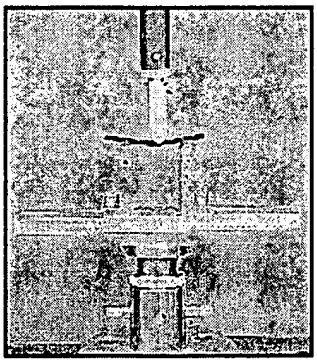
March 28, 2005



Flexural Properties



A2LA Accredited ASTM D790, ISO 178

ASTM and ISO specify somewhat different parameters for this test

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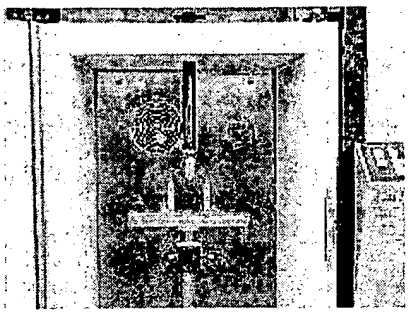
Scope:
The Flexural test measures the force required to bend a beam under 3 point loading conditions. The data is often used to select materials for parts that will support loads without flexing. Flexural modulus is used as an indication of a material's stiffness when flexed. Since the physical properties of many materials (especially thermoplastics) can vary depending on ambient temperature, it is sometimes appropriate to test materials at temperatures that simulate the intended end use environment.

Test Procedure:
Most commonly the specimen lies on a support span and the load is applied to the center by the loading nose producing three point bending at a specified rate. The parameters for this test are the support span; the speed of the loading; and the maximum deflection for the test. These parameters are based on the test specimen thickness, and are defined differently by ASTM and ISO.

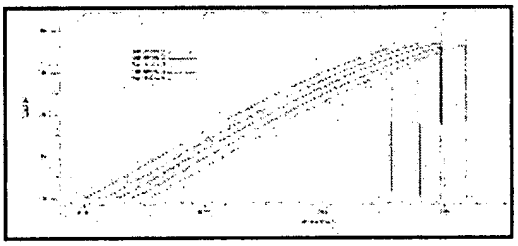
Elevated or Reduced Temperature Test Procedure:
A thermal chamber is installed on the Instron universal test machine. The chamber is designed to allow the test mounts from the base and crosshead of the Instron to pass through the top and bottom of the chamber. Standard test fixtures are installed inside the chamber, and testing is conducted inside the controlled thermal environment the same as it would be at ambient temperature. The chamber has internal electric heaters for elevated temperatures and uses external carbon dioxide gas as a coolant for reduced temperatures.



Test Specimen:
A variety of specimen shapes can be used for this test, but the most commonly used specimen size is 3.2mm x 12.7mm x 64mm (0.125" x 0.5" x 2.5") for ASTM, and 10mm x 4mm x 80mm for ISO.

Data:

Flexural strength, flexural stress at specified strain levels, and flexural modulus can be calculated.



Equipment used at Plastics Technology Laboratories. Inc.:
Instron Universal Tester
Flexural test fixtures

**Please note that this test description is intentionally generic in nature and aimed at providing a descriptive summary to enhance test understanding. For more information please contact a PTLI Technical Representative at ptli@ptli.com . Due to copyright restrictions, we are not able to provide copies of standards. Standards can be obtained from www.astm.org, www.iso.ch/iso/en, www.sae.org or other appropriate standards authorities.

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Document Summary

D790-03 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials

Developed by Subcommittee: D20.10
See Related Work by this Subcommittee
Adoptions: DOD Adopted; Building Codes;
Book of Standards Volume: 08.01

1. Scope

1.1 These test methods cover the determination of flexural properties of unreinforced and reinforced plastics, including high-modulus composites and electrical insulating materials in the form of rectangular bars molded directly or cut from sheets, plates, or molded shapes. These test methods are generally applicable to both rigid and semirigid materials. However, flexural strength cannot be determined for those materials that do not break or that do not fail in the outer surface of the test specimen within the 5.0 % strain limit of these test methods. These test methods utilize a three-point loading system applied to a simply supported beam. A four-point loading system method can be found in Test Method D 6272.

1.1.1 *Procedure A*, designed principally for materials that break at comparatively small deflections.

1.1.2 *Procedure B*, designed particularly for those materials that undergo large deflections during testing.

1.1.3 Procedure A shall be used for measurement of flexural properties, particularly flexural modulus, unless the material specification states otherwise. Procedure B may be used for measurement of flexural strength only. Tangent modulus data obtained by Procedure A tends to exhibit lower standard deviations than comparable data obtained by means of Procedure B.

1.2 Comparative tests may be run in accordance with either procedure, provided that the procedure is found satisfactory for the material being tested.

1.3 The values stated in SI units are to be regarded as the standard. The values provided in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

Note 1—These test methods are not technically equivalent to ISO 178.

2. Referenced Documents

D618 Practice for Conditioning Plastics for Testing
D638 Test Method for Tensile Properties of Plastics

D883 Terminology Relating to Plastics
D4000 Classification System for Specifying Plastic Materials
D5947 Test Methods for Physical Dimensions of Solid Plastic Specimens
D6272 Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials by Four-Point Bending
E4 Practices for Force Verification of Testing Machines
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

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Index Terms

flexural properties; plastics; stiffness; strength; 29.035.20

Document Summary

D747-02 Standard Test Method for Apparent Bending Modulus of Plastics by Means of a Cantilever Beam

Developed by Subcommittee: D20.10
See Related Work by this Subcommittee
Adoptions: DOD Adopted; Building Codes;
Book of Standards Volume: 08.01

1. Scope

1.1 This test method covers the determination of the apparent bending modulus of plastics by means of a cantilever beam. It is well suited for determining relative flexibility of materials over a wide range. It is particularly useful for materials too flexible to be tested by Test Methods D 790.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

Note 1—There is no known ISO equivalent for this standard.

2. Referenced Documents

D374 Test Methods for Thickness of Solid Electrical Insulation
D618 Practice for Conditioning Plastics for Testing
D790 Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
D4000 Classification System for Specifying Plastic Materials
D4066 Classification System for Nylon Injection and Extrusion Materials
E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods
E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

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Index Terms

apparent bending modulus; bending movement; cantilever beam; stiffness; 83.080.01

Citing ASTM Standards